Use of web*Mathematica* for optics training over the Web

James C. Wyant
Optical Sciences Center, University of Arizona, Tucson, AZ 85721
telephone: 520-621-2448; e-mail: jcwyant@optics.arizona.edu

Abstract: web*Mathematica* provides a good mathematical and graphical mechanism for using a web browser to study optics problems over the internet. Techniques for using web*Mathematica* to study interference, Fraunhofer and Fresnel diffraction, polarization, and Seidel and Zernike aberration will be described and illustrated. (See http://wyant.optics.arizona.edu/math.htm).

OCIS codes: (120.3180) Interferometry; (050.1940) Diffraction

Summary

Mathematica is very powerful for modeling optics problems because of its symbolic nature and the vast number of mathematical functions it contains and its graphics capability. However, because *Mathematica* has so many capabilities it takes a fair amount of work to become an expert using *Mathematica*. For this reason an optics user may get so involved in the *Mathematica* part of the problem that he loses sight of the optics that is being studied. However, most people are experts at using a web browser, so if *Mathematica* is used in such a way as to hide all the *Mathematica* complexity behind a web browser and present an optics user with the ability to vary the optical parameters of interest it is possible to study rather complex optical problems without being an expert at using the mathematical program used to solve the optical problem. Furthermore, if the *Mathematica* software is placed on a web server the computers running the web browser do not need to have *Mathematica* installed and the optics problem can be solved from any place where an internet connection is available.

web*Mathematica* makes it possible to solve mathematical optics problems over the internet without having any software other than a modern version of the web browser. This presentation will describe the procedure used to set up web*Mathematica* to solve optics problems and examples solving diffraction, interference, polarization and aberration problems will be given. The web*Mathematica* capability for studying optics problems can be seen at http://wyant.optics.arizona.edu/math.htm.

References

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